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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/519,571	03/09/2005	Akira Usui	8017-1156	8975
466	7590	01/30/2006	EXAMINER	
YOUNG & THOMPSON 745 SOUTH 23RD STREET 2ND FLOOR ARLINGTON, VA 22202			ULLAH, ELIAS	
			ART UNIT	PAPER NUMBER
			2812	

DATE MAILED: 01/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/519,571

Applicant(s)

USUI ET AL.

Examiner

Elias Ullah

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1- 29 and 31-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1- 29 and 31-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 December 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. 10/519571.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 12/30/2004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

This office action is in response to the application filed on 12/15/2004 and to the IDS filed on 12/3/2004.

Drawings

1. The drawings are objected to because: Fig.2 does not show the result of SEM observation as described in the specification on page 9, lines 25-26. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 2-29 and 31-32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claims 2, 11, 16 and 25 recite the limitation "group III nitride semiconductor" in claim 2, (lines 4-5), claim 11, (lines 4-5), claim 16, (lines 4-5) and claim 25, (lines 4-5). There is insufficient antecedent basis for this limitation in the claim. Examiner suggests inserting - layer- - after "semiconductor".

6. Claims 6-7 recite the limitation "growth temperature" in claim 6, (line 6) and claim 7, (line3). There is insufficient antecedent basis for this limitation in the claim. Examiner suggests inserting - - having a first growth temperature - - after "layer" in claim 6, line 5.

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7. Claims 6,15 and 24 recite the limitation "the site" in claim 6, (line 12) claim 15, (line 9), claim 24, (line 6). There is insufficient antecedent basis for this limitation in the claim. Examiner suggests inserting - - having a site - - after "voids" in claim 6, line 8.
8. Claims 20 and 24 recite the limitation "the surface" in claim 20, (line 4) and claim 24, (line 4). There is insufficient antecedent basis for this limitation in the claim. It is suggested that applicant should change the limitation to - - a surface - -.
9. Claim 29 recites the limitation "the whole surface" in line 4. There is insufficient antecedent basis for this limitation in the claim. It is suggested that applicant should change the limitation to the - - a surface - -.
10. Claims 21 and 31 recite the limitation "the step" in claim 21, (line 3) and claim 31, (line 3). It is suggested that applicant change the limitation to - - the steps --. There is insufficient antecedent basis for this limitation in the claim.
11. Claim 24 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is suggested that applicant define the term "V/III ratio of raw material gas is set to be 10".

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claim 1, 15 and 31-32 are rejected under 35 U.S.C. 102(e) as being anticipated by Yoshida at el (6,303,405 dated 10/16/2001).

3. With respect to claim 1, Yoshida at el shows the process as claimed in Fig.1A – Fig.1D and Fig.2-Fig.3 as: A process for producing a group III nitride semiconductor substrate, characterized in that the process comprises steps of: forming a film containing metal element on a base substrate (11, 12), forming a group III nitride semiconductor layer including region of voids therein on the metal element-containing film to be brought into direct contact therein, and peeling base substrate with use of said reign of voids as the site for peeling to take it away (Fig.1C, 13, Fig.2-3, 20A, 20C).

4. With respect to claim 15, Yoshida at el also shows the process as claimed in Fig.1A –Fig.1D and Fig.2-Fig.3 as: A process for producing a group III nitride semiconductor substrate, characterized in that the process comprises steps of: forming, on a base substrate, a metal element-containing film having a fine pore structure (20a, 20b, and 20c), forming a group III nitride semiconductor layer including region of voids therein on the metal element-containing film to be brought into direct contact therein, and peeling base substrate with use of said reign of voids as the site for peeling to take it away (Fig.1C, 13, Fig.2-3, 20A, 20C).

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5. With respect to claim 29, Yoshida at el also shows as claimed as: a process for producing a group III nitride semiconductor substrate wherein said metal element-containing film is formed on the whole surface of said base substrate (11, 12).

6. With respect to claim 31, Yoshida at el also shows as claimed as: a process for producing a group III nitride semiconductor substrate where in said steps of peeling said base substrate to take it away comprises a step of cooling down the temperature of the atmosphere post the growth of the group III nitride semiconductor layer spontaneously peel sad base substrate off (Fig. 9D, and Col 13, lines 1-5).

7. With respect to claim 32, Yoshida at el also shows as claimed as: a group III nitride semiconductor substrate being produced by using a process for producing a group III nitride semiconductor substrate as claimed in one of Claims 1,6,15,20 and 24 (11).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.

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3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claims 2-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida at el (6,303,405 dated 10/16/2001) in view of Miki at el (6800501 dated 10/5/2004) and Kusumoto et al (4849260 dated 07/18/1989).

11. Yoshida at el shows the process as claimed and as described in the preceding paragraphs, but fails to expressly disclose a metal element possessing a decomposing action; metal element is transition element; a heat-treating metal element-containing film and first group III nitride semiconductor layer at a temperature higher than growth temperature and temperature range, metal element-containing film is a metal film; a metal element-containing film having a fine pore structure (claim 15); carrying out treatment for eliminating of the nitrogen contained in metal nitride(claims 20-23).

12. With respect to claims 2, 3, 4 and 5, Miki at el also teaches metal element is nickel (Ni), gold (Au), platinum (Pt), chromium (Cr) or Titanium (Ti) (Col 2, lines 3-6). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have metal element possessing a decomposing action and metal element is transition element as shown by Miki at el, because the above are suitable for heat treatment in the primary reference of the Lee et al.

13. With respect to claim 6, Miki at el teaches a process of heat-treating said metal element-containing film (Col 6, lines 42-46) and said first group III nitride semiconductor layer at a temperature higher than said growth temperature for the group III nitride semiconductor layer (Col 2, lines 5-11). In view of this disclosure, it would have been

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obvious to one of ordinary skill in the art at the time the invention was made to have a heat-treating process on metal element-containing film, as shown by Miki at el because heat treatment can enhance firm adherence between the electrode and the semiconductor.

14. With respect to claim 7, Miki at el also teaches a process for producing a group III nitride semiconductor substrate claimed in claim 6, wherein said growth temperature for the first group III nitride semiconductor layer is within the range of 300C or grater (Col 12, lines 32-35). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to produce a group III nitride semiconductor substrate in the claimed range because over lapping ranges establish a prima facie case of obviousness. In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. In re Wertheim, 514 F.2D 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

15. With respect to claim 8, Yoshida at el teaches the process as claimed and first group III nitride semiconductor layer is conducted at a temperature rang of 1000°C - 1100°C (Col 6, lines 8-10). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to produce a group III nitride semiconductor layer in the claimed range because over lapping ranges establish a prima facie case of obviousness. In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. In re

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Wertheim, 514 F.2D 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

16. With respect to claim 9, Miki at el also teaches a process for producing a group III nitride semiconductor substrate claimed in Claim 6, wherein the thickness of said first group III nitride semiconductor layer is in the range of 2 nm to 500 nm (11a, Col 10, lines 31-33). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have a group III nitride semiconductor layer thickness in the claimed range because overlapping ranges establish a prima facie case of obviousness. In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. In re Wertheim, 514 F.2D 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

17. With respect to claim 10, Miki at el also teaches metal element-containing film is a metal film (Col 6, lines 56-57). It would have been obvious to one of ordinary skill in the art at the time the invention was made to produce metal element-containing film by metal film as shown by Miki at el, because metal selected from a group of metals such as Au, Pd, Pt, Ni and Cr can be imparted to the metal by forming the metal as a thin film.

18. With respect to claims 11-14, Miki at el also teaches metal element is nickel (Ni), gold (Au), platinum (Pt), chromium (Cr) or Titanium (Ti) (Col 2, lines 3-6). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have metal element possessing a decomposing action and metal

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element is transition element as shown by Miki at el, because the above are suitable for heat treatment in the primary reference of the Yoshida at el.

19. With respect to claim 15, Kusumoto et al teaches a metal element-containing film having a fine pore structure (58 and 60a). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a metal element-containing film having a fine hole/pore structure as shown by Kusumoto et al, because fine hole helps to make direct contact between substrate and group III semiconductor layer.

20. With respect to claims 16-19, Miki at el also teaches metal element is nickel (Ni), gold (Au), platinum (Pt), chromium (Cr) or Titanium (Ti) (Col 2, lines 3-6). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have metal element possessing a decomposing action and metal element is transition element as shown by Miki at el, because the above are suitable for heat treatment in the primary reference of the Yoshida at el.

Double Patenting

21. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., In re Berg, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); In re Goodman, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); In re Longi, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); In re Van Ornum, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); In re Vogel, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and In re Thorington, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to

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be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

22. Claims 1-5 and 15-19 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-5 and 36 of U.S. Patent No. 6,924,159.

23. With respect to claim 1, U.S. Patent '159 discloses a process for producing a group III nitride semiconductor substrate, characterized in that the process comprises steps of forming a film containing metal element on a base substrate, forming a group III nitride semiconductor layer including region of voids therein on the metal element-containing film to be brought into direct contact therewith (Patent Claim 1), and peeling said base substrate with use of said region of voids as the site for peeling to take it away (Patent Claim 5).

24. With respect to claim 2, U.S. Patent '159 discloses metal element-containing film contains a metal element possessing a decomposing action (Patent Claim 2 and Patent Claim 36).

25. With respect to claim 3 and 4, U.S. Patent '159 discloses metal element is a transition element (metal element such as gold, copper and platinum are well known in the art as transition element) metal element is scandium, titanium, zirconium, hafnium, vanadium, niobium, tantalum, chromium, molybdenum, tungsten, rhenium, iron, ruthenium, osmium, cobalt, rhodium, iridium, nickel, palladium, manganese, copper, platinum or gold (Patent claim 3).

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26. With respect to claim 5, U.S. Patent '159 discloses metal element is titanium, zirconium, hafnium, tantalum, platinum, cobalt or nickel (Patent claim 4).

27. With respect to claim 15-19 U.S. Patent '159 discloses as described in the preceding paragraphs and further discloses a metal element-containing film having a fine pore structure (Patent Claim 2).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elias Ullah whose telephone number is 571-272-1415. The examiner can normally be reached on 8-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MICHAEL LEBENTRITT can be reached on (571) 272-1873. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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EMU



MICHAEL LEBENTRITT
SUPERVISORY PATENT EXAMINER